

# United States Patent [19]

Hirao et al.

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[54] ANHYDROUS CRYSTALS OF MALTITOL  
AND THE WHOLE CRYSTALLINE  
HYDROGENATED STARCH  
HYDROLYSATE MIXTURE SOLID  
CONTAINING THE CRYSTALS, AND  
PROCESS FOR THE PRODUCTION AND  
USES THEREOF

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A61K 31/605; A61K 9/68

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426/660; 426/804

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## [56] References Cited

### U.S. PATENT DOCUMENTS

3,741,776 6/1973 Mitsuhashi ..... 99/141 R  
3,915,736 10/1975 Oyamada ..... 127/29  
3,918,986 11/1975 Hiraiwa ..... 129/29  
4,117,173 9/1978 Schiweck et al. ..... 536/4.1

## FOREIGN PATENT DOCUMENTS

39981 11/1981 European Pat. Off. ..... 536/4.1  
1169433 5/1964 Fed. Rep. of Germany ..... 536/4.1  
1383724 10/1975 United Kingdom .

## OTHER PUBLICATIONS

Wolfstrom, M. J. et al., "Melibitol and Maltitol," *J. Am. Chem. Soc.*, vol. 62, pp. 2553-2555 (1940).  
Hodge, J. E. et al., "Useful Properties of Maltose," *Cereal Science Today*, vol. 17, No. 7, pp. 180-188 (1972).  
Hidaka, Y. et al., "Maltitol Powder," Japan Kokai 74/87,619, *Chemical Abstracts* 82:60391, 1975.  
Kuno, K. et al., "Granulation of Maltitol," Japan, Kokai 75-59312 *Chemical Abstracts*, 83-133817 (1975).  
Hiraiwa, T., "Free-Flowing Maltitol," Japan Kokai 74-110,620, *Chemical Abstracts*, 82-171360 (1975).  
Hiraiwa, T., "Coating and Granulation of Maltitol", 76-106,766 *Chemical Abstracts*, 86:3758 (1977).  
Kane-Eda, J. et al., "Free-Flowing Maltitol Particles," Japan Kokai 75-29,510 *Chemical Abstracts*, 83:81773 (1975).  
Hiraiwa, T. "Maltitol Granulation", Japan Kokai 76:113,813 *Chemical Abstracts*, 86:60544 (1977).

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## [57] ABSTRACT

The present invention relates to anhydrous crystals of maltitol and the whole crystalline hydrogenated starch hydrolysate mixture solid containing the crystals, and processes for the production and use thereof.

4 Claims, 5 Drawing Figures